

## **DETAILED ACTION**

### ***Specification***

1. The disclosure is objected to because of the following informalities: the layout of specification does not comply with the guidelines as suggested above.

Appropriate correction is required.

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

### **Arrangement of the Specification**

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
- (f) BACKGROUND OF THE INVENTION.
  - (1) Field of the Invention.
  - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (g) BRIEF SUMMARY OF THE INVENTION.
- (h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (i) DETAILED DESCRIPTION OF THE INVENTION.
- (j) CLAIM OR CLAIMS (commencing on a separate sheet).
- (k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1795

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Soule (U.S. 4,700,013) in view of Harbison et al (U.S. 4,056,309).

5. Regarding claim 1, Soule discloses a hybrid solar energy generating system. The system converts solar energy into electricity using a silicon (i.e. semiconductor) solar cell 13 (col.2, line 12-23) and directs long wavelength solar radiation from a selective transmitting heat-mirror 25 to a high temperature receiver (Figure 1, col. 2, line 31-7, & 62-66). The selective transmitting heat-mirror 25 (i.e. an interference reflector film) reflects the long wavelength solar energy and some of short wavelength the receiver 31 and transmits the other portions of wavelength to the solar cell 13 (Figure 1, col. 2, line 62-66 & col. 3, line 6-10).

Soule does not teach the heat-mirror as being movable. However, Harbison et al disclose a renewable surface of solar mirror having a reel device for selectively changing portions of the flexible mirror material (ABSTRACT). A flexible mirror material/film 68 is used to direct solar light to a receiver and mounted on a mirror

Art Unit: 1795

support surface 14 which has motor operated reels 38 and 40 for positioning the given portion of the flexible mirror material (Figure 2, col. 2, line 63-67). Harbison further indicates that the surface of the solar mirror having a reel device can be kept clean and selectively replaced in a less expensive manner by rotating the reels (col. 1, line 31-34). Therefore, it would be obvious for one having ordinary skill in the art to utilize the solar mirror having a reel device as suggested by Harbison in order to keep the mirror surface clean and easily replacing the mirror surface in the device of Soule, hence maintaining high conversion efficiency of Soule.

6. Regarding claim 2, a Fresnel lens 3 is located above the heat mirror 25 of Soule (Figure 1) and the Fresnel lens 3 concentrates solar radiation (Figure 1, col. 2, line 4-12).

7. Regarding claim 3, the motors 38 and 40 of Harbison rotate reels to position flexible material 68 (Figure 2, col. 3, line 1-5).

8. Regarding claim 4, Harbison teaches that the motors 38 and 40 cooperate to either position new material onto the surface or to replace the new mirror material with older and previously used flexible mirror material (i.e. continuously or discontinuously re-reeled, col. 3, line 5-9)

9. Claims 5-7, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Soule (U.S. 4,700,013) in view of Harbison et al (U.S. 4,056,309) and in further view of Konold (PG-PUB U.S. 2002/0121298) .

10. Regarding claim 5, The system comprises: (1) a Fresnel lens 3 that concentrates solar rays 1(Figure 1, col. 1, line 65-66); (2) a solar cell 13 receiving the solar energy

Art Unit: 1795

from lens 3 after being concentrated (i.e. a solar cell at the focus point of the lens, Figure 1, col. 2, line 4-12); and (3) a selective transmitting heat-mirror 25 positioned between the solar cell 13 and the lens 3, wherein the mirror 25 splits some solar spectrum into long and short wavelength and the mirror can also be in the form of a film (i.e. an interference reflector film, Figure 1, col. 2, line 31-7, & 62-66).

Soule does not teach the heat-mirror as being movable. However, Harbison et al disclose a renewable surface of solar mirror having a reel device for selectively changing portions of the flexible mirror material (ABSTRACT). A flexible mirror material/film 68 is used to direct solar light to a receiver and mounted on a mirror support surface 14 which has motor operated reels 38 and 40 for positioning the given portion of the flexile mirror material (Figure 2, col. 2, line 63-67). Harbison further indicates that the surface of the solar mirror having a reel device can be kept clean and selectively replaced in a less expensive manner by rotating the reels (col. 1, line 31-34). Therefore, it would be obvious for one having ordinary skill in the art to utilize the solar mirror having a reel device as suggested by Harbison in order to keep the mirror surface clean and easily replacing the mirror surface in the device of Soule, hence maintaining high conversion efficiency of Soule.

Soule/Harbison does not teach the lens being installed in a frame. It is well known in the art that a Fresnel lens is mounted on a frame for a secure installation. This is evident by the teaching of Konold. Konold discloses a combined solar collector panel having a Fresnel lens 205 that is mounted on a frame 407 (Figures 2 & 4, paragraph [0028]). Therefore, it would be obvious for one having ordinary skill in the art to mount

Art Unit: 1795

the Fresnel lens of Soule/Harbison on a frame as suggested by Konold in order to secure the device of Soule/Harbison. In addition, Konold teaches multiple lenses (Figure 2).

11. Regarding claim 6, the flexible mirror of Harbison is in the form of film (col. 2, line 63-65).

12. Regarding claim 7, the solar cell 13 of Soule is silicon solar cell (col. 2, 15-18) and is within the focusing point of lens 3 (Figure 1, col. 2, line 4-12).

13. Regarding claim 9, Soule teaches that the solar cell 13 is mounted on a cooling channel 17 (i.e. a heat sink, Figure 1, col. 2, line 23-25). Konold teaches that the photovoltaic grids201 are mounted on a heat transfer unit 202 using liquid as media (Figure 2, paragraph [0047]).

14. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Soule (U.S. 4,700,013) and Harbison et al (U.S. 4,056,309) and Konold (PG-PUB U.S. 2002/0121298) as applied to claim 5 above, and further in view of Kleinwachter (PG-PUB U.S. 2001/0054252).

15. Regarding claim 8, Soule/Harbison/Konold does not teach an optical wave guide in the focus point. However, Kleinwachter discloses a light element using a Fresnel lens 2 and a light guide 16 (i.e. an optical wave guide, Figure 3, paragraph [0037]).

Kleinwachter indicates that the system with a light guide on the focusing point of a Fresnel lens can provide heating cooling and illuminate more distance zone in the building (paragraph [0040]). Therefore, it would be obvious for one having ordinary skill in the art to include a light guide on the focusing point of the lens as suggested by

Art Unit: 1795

Kleinwachter in the system of Soule/Harbison/Konold in order to provide lighting in more remote areas besides providing electricity and heating.

16. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Soule (U.S. 4,700,013) and Harbison et al (U.S. 4,056,309) and Konold (PG-PUB U.S. 2002/0121298) as applied to claim 7 above, and further in view of Tornstrom (U.S. 4,134,387).

17. Regarding claim 10, Soule/Harbison/Konold does not teach a gas flowing through the heat sink. However, Tornstrom disclose a solar energy concentrator having reflective sheet material (ABSTRACT). Tornstorm teaches to cool the solar cell 42 using air under atmospheric pressure which is higher than a pressure of 1 bar (Figure 3, col. 4, line 33-42). The teaching of Tronstrom shows that air is an equivalent coolant to cool a solar cell. Therefore, one having ordinary skill in the art would have found it obvious to substitute air for liquid.

18. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Soule (U.S. 4,700,013) and Harbison et al (U.S. 4,056,309) and Konold (PG-PUB U.S. 2002/0121298) as applied to claim 7 above, and further in view of Posthuma et al (PG-PUB U.S. 2005/0000566).

19. Regarding claim 11, Soule/Harbison/Konold does not teach a thin-layered semiconductor having a bandgap less than 0.7 eV being located between the solar cell and the cooling channel. However, Posthuma disclose a stacked germanium solar cell that has a layer of silicon on the germanium surface (ABSTRACT, Figure 1, paragraphs [0058] – [0062]). Posthuma indicates that the stacked solar cell can absorb wider range

Art Unit: 1795

of solar spectrum, hence improving conversion efficiency (paragraph [0019]). Therefore, it would be obvious for one having ordinary skill in the art to include a germanium substrate as suggested by Posthuma in order to enhance conversion efficiency of the device of Soule/Harbison/Konold. It is known in the art that germanium has a bandgap of 0.66 eV.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xiuyu Tai whose telephone number is 571-270-1855. The examiner can normally be reached on Monday - Friday, 7:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Application/Control Number: 10/587,797

Page 9

Art Unit: 1795

/X. T./

Examiner, Art Unit 1795

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795